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Short communication

Soil carbon sequestration and its role in economic development: a donor perspective

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Abstract

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Donor programs, even those dealing directly with conservation and the environment, have a focus on improving the livelihoods of the poor. It is in this context that the United States Agency for International Development (USAID) is interested in soil carbon sequestration. Soil carbon sequestration forms a nexus between the global process of the carbon cycle and local processes of soil fertility. It also forms a nexus between broad biophysical processes and socio-economic processes.

This can be considered in a three-dimensional context. First, people invest in sound natural resources management (NRM) when it leads to more secure and prosperous livelihoods (USAID, 2002). Second, resources are often shared. Consequently, increasing population pressure increases the potential for conflict. Third, maintaining biodiversity and mitigating the effects of climate change requires good natural resources stewardship. In turn, quality of life is linked to healthy biodiversity and stable climates. At USAID, as well as within other international donor agencies, we are placing greater consideration on the environmental services offered by the environment to address these issues. By placing a social and economic

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value on these resources which accrue directly to rural communities, their wise management can be facilitated.

Some scientists suggest that the highest potential for soil carbon sequestration can be found in degraded lands including the semi-arid and sub-humid regions of Africa (USGS, 2000). Due to a combination of increasing population and animal densities, over-cultivation, extensive fuelwood gathering and overgrazing, as well as unfavorable economic and agricultural policies, these regions have been experiencing critical losses of biomass and a decline in biological diversity and productivity. Degraded lands not only have exhausted most of their capacity to sequester carbon but also have emitted a substantial amount of CO_2 from the soil to the atmosphere, thereby contributing to the greenhouse effect and global warming.

Improved dryland farming, range management, and irrigation could reverse this trend by replenishing depleted soil carbon stocks. It is the rehabilitation of degraded areas through successful carbon sink management that is at the heart of soil carbon sequestration for local, societal, and global benefits.

Most African countries rank very low among the global emitters of CO_2 from fossil fuel burning and, therefore, have played only minor roles in international projects that address global warming. However, many of these countries experience alarming rates of declining soil carbon, soil quality and fertility due to land degradation and desertification. Soil carbon sequestration would permit African countries to proactively participate in and benefit from global change mitigation, simultaneously addressing three important international conventions: The Convention on Climate Change, The Convention to Combat Desertification, and The Convention on Biological Diversity.

Although the sequestration of carbon, whether in soils or biomass, will unlikely provide sufficient financial incentives for rural populations to engage in efforts to sequester carbon, the potential income from trading mechanisms can offset the opportunity cost of establishing carbon management schemes. The real payoff will be in the increased incomes from resultant improved agricultural production, land, forest and wildlife management. Further, by establishing clear ownership over the carbon resource, land tenure uncertainty can be alleviated.

Rural populations tend not to operate from a profit-maximizing objective so much as one of minimizing risk. The practices through which carbon may be sequestered can help to achieve this objective. Carbon trading mechanisms are complex and require a considerable level of social organization. Because of this, community-based approaches that make use of existing community organizations and rural trade associations provide a contractual basis for engaging in such activities. These organizations are most frequently established around a set of commodities such as crops, livestock, wildlife, or tourism. The carbon commodity potentially expands their portfolio and can make use of their existing management and benefit distribution mechanisms without starting social organization from scratch.

Thus, donor involvement in soil and biomass carbon sequestration efforts serves to strengthen social and financial institutions among the rural poor. This creates a nexus between the environmental services offered by local landscapes with global concerns over atmospheric carbon levels and increased rural livelihoods.

References

USAID, 2002. Nature, Wealth, and Power: Emerging Best Practice for Revitalizing Rural Africa. USAID Africa Bureau.

USGS, 2000. Soil carbon sequestration in semi-arid and sub-humid Africa. Proceedings, Carbon Sequestration Workshop, Dakar, Senegal, September 25–27, 2000.